

REMARKS

I. Status of Claims

Claims 1-9 and 12-16 are pending in the application. Claim 1 is the only independent claim. Claims 10-11 were previously canceled. Claims 12-16 were newly added. The Applicant respectfully believes that no new matter is added.

Claims 1, 2, 6, 7, and 9 stand rejected under 35 USC 103(a) as allegedly being unpatentable over Miyamoto (JP2003-278539) (“Miyamoto”) in view of Tabata (JP2001-023666) (“Tabata”) and in evidence of Critoph et al. (USP 5,845,506) (“Critoph”).

Claims 3-5 and 8 stand rejected under 35 USC 103(a) as allegedly being unpatentable over Miyamoto in view of Tabata, as applied to claim 2 above, and in further view of Bass (USP 6,272,873) (“Bass”).

The Applicant respectfully requests reconsideration of the these rejections in view of the foregoing amendments and the following remarks.

II. Pending Claims

Independent claim 1, the only independent claims, stands rejected under 35 USC 103(a) as allegedly being unpatentable over Miyamoto in view of Tabata and in evidence of Critoph.

The Applicant respectfully submits that claim 1 is patentable over Miyamoto at least because it recites, *inter alia*, “...wherein the cooling device is a heat pump that generates the low temperature thermal medium by utilizing heat from the high temperature thermal medium...” and “...wherein the working device is a drive source mounted on a vehicle for causing the vehicle to travel, and the high temperature thermal medium is **high temperature coolant** that has been used to cool the drive source....” (emphasis added)

Certain embodiments of the present invention relate to an energy recovery system for converting heat generated during operation of a working device (e.g., motor and internal combustion engine of a hybrid vehicle) into electrical energy using first and second thermal media (e.g., refrigerant and engine coolant) and recovering the electrical energy. The system includes a cooling device (e.g., a heat pump) that cools one of the thermal media, generating a

low temperature thermal medium by maintaining the temperature of the one of the thermal media at a predetermined value, and a thermoelectric converter that generates electricity by utilizing a temperature difference between the low temperature thermal medium and the other one of the thermal media. The other one of the thermal media is maintained at a temperature higher than the low temperature thermal medium by heat generated during operation of the working device to generate a high temperature thermal medium with the other one of the thermal media. The cooling device is a heat pump that generates the low temperature thermal medium by utilizing heat from the high temperature thermal medium.

The Applicant respectfully submits that Miyamoto describes a heat utilization system for collecting and exploiting the thermal energy in the exhaust gas from a diesel engine and utilizes a heat pump. Also, Miyamoto uses cooling water and exhaust gases as the low and high temperature thermal mediums, respectively. Thus, as recognized by the Office Action on page 3, Miyamoto fails to at least teach a high temperature medium being an engine coolant as required by the invention of claim 1.

In order to address this deficiency, the Office Action cites Tabata and contends that “it would have been obvious for one having ordinary skill in the art to utilize engine coolant as the high temperature side as suggested by Tabata in the device of Miyamoto in order to generate stable high temperature side [sic] for better heat recovery.”

Tabata, as discussed in the “Background Art” section of the instant specification as published, utilizes engine coolant *and air* as the low and high temperature thermal mediums, respectively. However, as required by the invention of claim 1, Tabata does not use engine coolant and refrigerant.

In addition, Tabata also requires that the power source and other working devices are controlled to increase the coolant temperature so that the temperature difference between the coolant and the outside air is sufficient for generating electricity. As stated in paragraph [0004] of the specification as published, Tabata has drawbacks:

[0004] However, in a vehicle using an energy recovery system according to the above publication, normal operation of the power source and other working devices cannot increase the temperature of the power source and

other working devices (the temperature of the coolant) above a certain level. Therefore, the temperature difference between the coolant and the outside air can be insufficient for generating electricity with the thermoelectric converter. Therefore, in Japanese Laid-Open Patent Publication No. 2001-23666 [Tabata] operation of the power source and other working devices is controlled to increase the coolant temperature so that the temperature difference between the coolant and the outside air is sufficient for generating electricity. ***However, the control for increasing the temperature of the power source and other working devices can adversely affect the power source and other working devices.***

As discussed in MPEP 2143.01, obviousness can be established by combining or modifying the ***teachings of the prior art*** to produce the claimed invention where there is some ***teaching, suggestion, or motivation*** to do so. *In re Kahn*, 441 F.3d 977, 986, 78 USPQ2d 1329, 1335 (Fed. Cir. 2006) (discussing rationale underlying the motivation-suggestion-teaching *>test< as a guard against using hindsight in an obviousness analysis).

However, the Applicant respectfully submits that, the Office Action ***does not*** provide any teaching, suggestion, or motivation in ***the prior art itself*** to modify Miyamoto in the manner as claimed in the invention of claim 1. Rather, it appears that Examiner has provided the motivation using the Applicant's own specification as a blueprint. Tabata does not, however, indicate that utilizing engine coolant generates stability on the high temperature side for better heat recovery.

Moreover, if a proposed modification or combination (i.e., modifying Miyamoto with Tabata) changes the principle of operation (i.e., modifying the cooling and piping systems of Miyamoto) of the invention being modified, then the teachings of the references are ***not*** sufficient to render the claims *prima facie* obvious. *See In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). *See also* MPEP 2143.01.

Accordingly, it is respectfully submitted that lacking any teaching and/or suggestion for modifying Miyamoto in the manner as claimed in the invention of claim 1, claim 1, and its dependent claims are patentable over the cited references.

Further, the dependent claims further distinguish certain embodiments of the present invention from the cited references. For example, claim 12 recites that, *inter alia*, "...wherein the first and second thermal media are different." It is respectfully submitted that the alleged modification of Miyamoto would lead to having cooling water (i.e., the same thermal media) as both the high and low temperature coolants, but not different thermal media.

III. Conclusion

In light of the above discussion, Applicants respectfully submit that the present application is in all aspects in allowable condition, and earnestly solicits favorable reconsideration and early issuance of a Notice of Allowance.

The Examiner is invited to contact the undersigned at (202) 220-4420 to discuss any matter concerning this application. **The Office is authorized to charge any fees related to this communication to Deposit Account No. 11-0600.**

Respectfully submitted,

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By: /Daniel G. Shanley/
Daniel G. Shanley
(Reg. No. 54,863)

KENYON & KENYON LLP
1500 K Street, N.W., #700
Washington, D.C. 20005
Telephone: (202) 220-4200
Facsimile: (202) 220-4201